WHAT IS CLAIMED IS:

1. A multi-layer laminate comprising a plurality of successively stacked layers of respective organic-inorganic composite materials, wherein:

each of said organic-inorganic composite materials is respectively produced by polycondensating a metal alkoxide through hydrolysis until a remaining unreacted amount of said metal alkoxide is reduced to no more than 3 vol.%, and then mixing at least said metal alkoxide that has been polycondensated with an organic polymer;

said layers respectively have different concentrations of a metal element in said metal alkoxide of said respective organic-inorganic composite material, such that said laminate has a concentration gradient with a varying concentration of said metal element through a thickness of said laminate from a first side to a second side of said laminate.

2. The multi-layer laminate according to claim 1, wherein said laminate has a refractive index gradient with a varying refractive index through said thickness of said laminate.

3. The multi-layer laminate according to claim 2, wherein said refractive index varies opposite said concentration.

4. The multi-layer laminate according to claim 3, wherein said concentration of said metal element increases monotonously through said thickness from said first side to said second

side, and said refractive index decreases monotonously from said first side to said second side.

5. The multi-layer laminate according to claim 3, wherein said concentration of said metal element first increases and then decreases in succession through said thickness from said first side to said second side, and said refractive index first decreases and then increases in succession through said thickness from said first side to said second side.

6. The multi-layer laminate according to claim 3, wherein said concentration of said metal element first decreases and then increases in succession through said thickness from said first side to said second side, and said refractive index first increases and then decreases in succession through said thickness from said first side to said second side.

7. The multi-layer laminate according to claim 1, wherein said concentration of said metal element increases monotonously through said thickness from said first side to said second side.

8. The multi-layer laminate according to claim 1, wherein said concentration of said metal element first increases and then decreases in succession through said thickness from said first side to said second side.

9. The multi-layer laminate according to claim 1, wherein said concentration of said metal element first decreases and then increases in succession through said thickness from said first side to said second side.

10. The multi-layer laminate according to claim 1, wherein said metal alkoxide is one of Si alkoxide, Ti alkoxide, and Zr alkoxide.

11. The multi-layer laminate according to claim 1, wherein said organic-inorganic composite materials respectively have an optical transmittance of at least 90% per 10μm thickness of said organic-inorganic materials for light having a wavelength of 600 to 1000nm.

12. The multi-layer laminate according to claim 1, wherein said organic-inorganic composite materials respectively have an overall content of said metal element in a range from 0.1 to 46 wt.%.

13. The multi-layer laminate according to claim 12, wherein said overall content of said metal element is in a range from 5 to 37 wt.%.

14. The multi-layer laminate according to claim 1, wherein said organic-inorganic composite materials are made up of organic domains and inorganic domains, wherein said organic domains and said inorganic domains have domain sizes not more than 0.1μm.

15. The multi-layer laminate according to claim 1, comprising at least seven of said layers.

16. An optical waveguide comprising the laminate according to claim 1, wherein said layers respectively have different refractive indices.

17. The optical waveguide according to claim 16, configured as a planar optical waveguide with said layers respectively extending along flat planes.

18. The optical waveguide according to claim 16, further comprising a substrate including a metallic element, and an oxide layer of an oxide of said metallic element formed on said substrate, and wherein said laminate is disposed on said oxide layer, one of said layers of said laminate having a relatively lower refractive index serves as a cladding layer located proximate to said oxide layer, and another of said layers of said laminate having a relatively higher refractive index serves as a light transmission layer located distally from said oxide layer.

19. A light transmission structure comprising:

a metallic substrate including a metallic element;

a metal oxide layer arranged on said substrate; and

a light transmission layer that is arranged directly or indirectly on said metal oxide layer and that consists of a first organic-inorganic composite material produced by

polycondensating a metal alkoxide through hydrolysis until a remaining unreacted amount of said metal alkoxide is reduced to no more than 3 vol.%, and then mixing at least said metal alkoxide that has been polycondensated with an organic polymer.

20. The light transmission structure according to claim 19, wherein said metal oxide layer contains an oxide of said metallic element of said metallic substrate.

21. The light transmission structure according to claim 19, wherein said metallic element of said metallic substrate is Si.

22. The light transmission structure according to claim 19, wherein said metal oxide layer has a thickness of 5nm to 20μm.

23. The light transmission structure according to claim 19, wherein said light transmission layer has a thickness of 4μm to 500μm.

24. The light transmission structure according to claim 19, wherein said metal oxide layer has characteristics as result from having been formed by deposition from a gaseous phase.

25. The light transmission structure according to claim 19, wherein said light transmission layer is arranged directly on said metal oxide layer.

26. The light transmission structure according to claim 19, further comprising a cladding layer that is arranged between said light transmission layer and said metal oxide layer and that consists of a second organic-inorganic composite material having a lower refractive index than said first organic-inorganic composite material of said light transmission layer.

27. The light transmission structure according to claim 19, further comprising a cladding layer that is arranged on said light transmission layer on a side thereof opposite said metal oxide layer and that consists of a second organic-inorganic composite material having a lower refractive index than said first organic-inorganic composite material of said light transmission layer.